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Docket No.: 245493US41X CONT

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

RE: Application Serial No.: 10/715,855
Applicants: Francois KUBICA
Filing Date: November 19, 2003
For: SYSTEM FOR OPERATING AN AIRCRAFT
Group Art Unit: 3661
Examiner: Nguyen, T.

SIR:

Attached hereto for filing are the following papers:

APPEAL BRIEF WITH APPENDICES

Our credit card payment form in the amount of **$500.00** is attached covering any required fees. In the event any variance exists between the amount enclosed and the Patent Office charges for filing the above-noted documents, including any fees required under 37 C.F.R 1.136 for any necessary Extension of Time to make the filing of the attached documents timely, please charge or credit the difference to our Deposit Account No. 15-0030. Further, if these papers are not considered timely filed, then a petition is hereby made under 37 C.F.R. 1.136 for the necessary extension of time. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
FRANCOIS KUBICA	: EXAMINER: NGUYEN, T.
SERIAL NO: 10/715,855	:
FILED: NOVEMBER 19, 2003	: GROUP ART UNIT: 3661
FOR: SYSTEM FOR OPERATING AN AIRCRAFT	:

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the decision of the Examiner dated May 17, 2006, which finally rejected Claims 1-10 and 12-29 in the above-identified patent application.

I. REAL PARTY-IN-INTEREST

The real part-in-interest is Airbus France S.A.S.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative, and the assignees are aware of no appeals which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-10 and 12-29 have been finally rejected and form the basis for this appeal. Appendix VIII includes a clean copy of appealed Claims 1-10 and 12-29.

IV. STATUS OF AMENDMENTS

An amendment after final rejection was filed September 29, 2006. The Advisory Action of October 13, 2006 indicated that this amendment was not entered for purposes of appeal. Thus, the claims pending as of the May 17, 2006 final rejection are treated herein.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1 is directed to a system for operating an aircraft including a navigation computer, a flight control computer, and a dedicated communication link. The navigation computer includes a first input configured to receive guidance instructions including heading, vertical speed, and altitude; a second input configured to receive guidance parameters; and an output configured to output automatic pilot instructions computed by said navigation computer from said guidance instructions. The flight control computer includes a first input configured to receive control instructions; a second input configured to receive said automatic pilot instructions, and a command generator configured to generate a first plurality of operating commands based on said automatic pilot instructions. The dedicated communication link is configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer. This system is described in the specification from page 5, line 25 to page 6, line 17, as illustrated by Figure 3. Navigation computer 9A receives guidance instructions including heading, vertical speed, and altitude over first input 11 and guidance parameters over second input 12. Navigation computer 9A transmits automatic pilot instructions to flight control computer 3 over a dedicated

communication link 18. Flight control computer 3 receives the automatic pilot instructions over a second input connected to dedicated communication link 18. Flight control computer 3 receives control instructions over first input 4. Flight control computer 3 also includes a command generator configured to generate a first plurality of operating commands based on said automatic pilot instructions.

Independent Claim 12 is directed to a system for operating an aircraft including a navigation computer, a flight control computer, and dedicated communication means. The navigation computer includes means for receiving guidance instructions including heading, vertical speed, and altitude; means for receiving guidance parameters; and means for outputting automatic pilot instructions computed by said navigation computer from said guidance instructions. The flight control computer includes means for receiving control instructions; means for receiving said automatic pilot instructions; and means for generating a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode. The dedicated communication means transmit the automatic pilot instructions from the navigation computer to the flight control computer. This system is described in the specification from page 5, line 25 to page 6, line 17, as illustrated by Figure 3. Navigation computer 9A receives guidance instructions including heading, vertical speed, and altitude over means for receiving guidance instructions 11 and guidance parameters over means for receiving guidance parameters 12. Means for outputting automatic pilot instructions included in navigation computer 9A transmit automatic pilot instructions to flight control computer 3 over a dedicated communication means 18. Flight control computer 3 includes means for receiving said automatic pilot instructions which receive the automatic pilot instructions over dedicated communication means 18. Flight control computer 3 receives control instructions over means for receiving control instructions 4. Flight control

computer 3 also includes means for generating a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode.

Independent Claim 21 is directed to a system for operating an aircraft including a navigation computer, a flight control computer, and a dedicated communication link. The navigation computer is configured to receive guidance instructions and parameters and to output automatic pilot instructions. The flight control computer is configured to receive control instructions and said automatic pilot instructions, and to generate a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode. The dedicated communication link is configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer. This system is described in the specification from page 5, line 25 to page 6, line 17, as illustrated by Figure 3. Navigation computer 9A receives guidance instructions including heading, vertical speed, and altitude over first input 11 and guidance parameters over second input 12. Navigation computer 9A transmits automatic pilot instructions to flight control computer 3 over a dedicated communication link 18. Flight control computer 3 receives the automatic pilot instructions over a second input connected to dedicated communication link 18. Flight control computer 3 receives control instructions over first input 4. Flight control computer 3 also generates a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The grounds of rejection to be reviewed on appeal are whether Claims 1-10 and 12-29 are unpatentable under 35 U.S.C. §103(a) over McDowell (U.S. Patent No. 4,463,605) in view of Pages (U.S. Patent No. 5,774,818).

VII. ARGUMENTS

A. Introduction

Claim 1 recites, *inter alia*, a system for operating an aircraft comprising:

> a navigation computer comprising:
> a first input configured to receive guidance instructions including heading, vertical speed, and altitude,
> a second input configured to receive guidance parameters, and
> an output configured to output automatic pilot instructions computed by said navigation computer from said guidance instructions;
> a flight control computer comprising:
> a first input configured to receive control instructions,
> a second input configured to receive said automatic pilot instructions, and
> a command generator configured to generate a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode; and
> a dedicated communication link configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer.

Claim 12 recites, *inter alia*, a system for operating an aircraft comprising:

> a navigation computer comprising:
> means for receiving guidance instructions including heading, vertical speed, and altitude,
> means for receiving guidance parameters, and
> means for outputting automatic pilot instructions computed by said navigation computer from said guidance instructions;
> a flight control computer comprising:
> means for receiving control instructions,
> means for receiving said automatic pilot instructions, and
> means for generating a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode; and
> dedicated communication means for transmitting the automatic pilot instructions from the navigation computer to the flight control computer.

Claim 21 recites, *inter alia*, a system for operating an aircraft comprising:

> a navigation computer configured to receive guidance instructions and parameters, and to output automatic pilot instructions;
>
> a flight control computer configured to receive control instructions and said automatic pilot instructions, and to generate a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode; and
>
> a dedicated communication link configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer.

B. Claims 1-10 and 12-29 are not unpatentable over McDowell in view of Pages

In a guided craft, two different algorithms, fed by different inputs, are needed to produce two very different outputs for guiding the craft. First, a guidance algorithm is input with position information and desired route information and computes guidance commands, such as a roll rate. Second, the guidance commands are sent to an autopilot algorithm which computes actuator commands based on the guidance commands that will cause the craft to follow the desired path. The autopilot algorithm is dependent on the aerodynamics of the craft and the response characteristics of the actuators. Thus, in the critical path calculations of a craft's navigation system, two separate and processor intensive algorithms must be run for each course correction or command.

In the invention recited in Claim 1, there are two separate computers, a navigation computer and a flight control computer. The navigation computer receives guidance instructions including heading, vertical speed, and altitude and guidance parameters and computes automatic pilot instructions. Thus, the navigation computer includes the guidance algorithm described above. The flight control computer receives the automatic pilot instructions and computes operating commands that are sent to the actuators of the control surfaces of the craft. Thus, the flight control computer includes the autopilot algorithm described above. Further, the flight control computer receives the automatic pilot instructions

over a dedicated communication link to minimize the time delay from the computation of the automatic pilot instructions to the computation of the operating commands.

The outstanding Office Action cited autopilot 14 of McDowell as "a navigation computer" and CSEU 16 of McDowell as "a flight control computer."[1] Link 52 of McDowell was cited as "a dedicated communication link configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer."[2] However, the link 52 of McDowell does not provide "automatic pilot instructions," but instead provides the command signals for the secondary surfaces. Thus, although CSEU 16 may create electrical command signals in response to the pilot controls 48, the autopilot 14 provides the electrical command signals itself when the autopilot is active. Thus, when the autopilot is active, CSEU 16 does not compute anything, it simply passes the command signals directly to the secondary surface actuators 42. Accordingly, CSEU 16 of McDowell does not include "a command generator configured to ***generate*** a first plurality of operating commands ***based on said automatic pilot instructions*** in an automatic pilot mode."

For example, McDowell states, "The electrical command signals produced by CSEU 16 are derived indirectly from either secondary pilot controls 48, such as the spoiler/speed brake lever shown coupled to CSEU 16 by dotted line linkage 50, ***or from autopilot 14 in the form of electrical control signals communicated over bus 52.***"[3] Further, "As mentioned, position command signals for the secondary control surfaces are produced by CSEU 16, either in response to manual pilot controls 48, ***or indirectly by autopilot 14*** (FIG. 2). In the latter case, ***the autopilot 14 is the source of such command signals for deploying the secondary surfaces***, such as the spoilers, in coordination with primary surfaces such as the

[1]See the Office Action dated May 17, 2006, page 2, line 15.
[2]See the Office Action dated May 17, 2006, page 2, lines 21-22.
[3]McDowell, column 6, lines 29-35.

ailerons for augmenting the flight control functions of the primary surfaces in a manner well known in the design of aircraft controls."[4]

The Advisory Action of September 12, 2006 asserted that even if CSEU 16 of McDowell simply passes through actuator commands, passing through the commands is read on by the verb "generate."[5] However, this paraphrasing of the claim language ignores the rest of the feature of the navigation computer. Claim 1 recites "a command generator configured to generate a first plurality of operating commands ***based on said automatic pilot instructions*** in an automatic pilot mode." Thus, since at most CSEU 16 of McDowell simply passes through commands received from another computer, CSEU 16 of McDowell never generates a first plurality of operating commands ***based on said automatic pilot instructions***. Accordingly, CSEU 16 of McDowell is not "a flight control computer" as defined in Claim 1.

Further, as link 52 of McDowell does not provide "automatic pilot instructions" to CSEA 16 of McDowell for CSEA 16 to create a first plurality of operating commands based on, link 52 is not "a dedicated communication link" as defined in Claim 1. As noted above, CSEA 16 simply passes command signals received from autopilot 14 over link 52 to the secondary surface actuators 42. Therefore, autopilot 14 of McDowell is presumably calculating both guidance and automatic pilot instructions, burdening the autopilot 14 with ***both*** the guidance and autopilot algorithms described above. As noted above, in the invention recited in Claim 1, no single computer is burdened with both tasks, and the guidance instructions are sent to the flight control computer as quickly as possible. McDowell does not teach or suggest such an apparatus.

Accordingly, McDowell does not teach or suggest "a navigation computer" or "a dedicated communication link" as defined in Claim 1.

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[4]McDowell, column 6, lines 39-48.
[5]See the Advisory Action dated September 12, 2006, page 2, lines 4-7.

Further, the Office Action conceded that autopilot 14 of McDowell (cited as "a navigation computer") does not include "a first input" or "a second input" as defined in Claim 1. The outstanding Office Action apparently cited automatic piloting device 13 of Pages as "a navigation computer" including such first (from 12-13) and second (from 15) inputs.[6]

Initially, it is respectfully noted that no part of the device described by Pages receives an input from 12-13 and an input from 15. Thus, Pages does not teach or suggest "a first input" and "a second input" as defined in Claim 1.

Assuming *arguendo* that the automatic piloting device 13 of Pages is cited as "a navigation computer," it is respectfully noted that the automatic piloting device 13 of Pages provides control instructions to actuators 14, and thus does not include "an output configured to output automatic pilot instructions computed by said navigation computer from said guidance instructions." Thus, automatic piloting device 13 of Pages presumably is also burdened by ***both*** a guidance algorithm and an autopilot algorithm. Accordingly, automatic piloting device 13 of Pages is not "a navigation computer" as defined in Claim 1.

The Advisory Action of September 12, 2006 asserts that device 13 of Pages must receive "some known input."[7] Applicant does not dispute that device 13 of Pages does in fact receive some inputs. However, it is respectfully submitted that these inputs are not "a first input" and "a second input" as defined in Claim 1.

Further, Pages also does not teach or suggest "a dedicated communication link configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer" as recited in Claim 1.

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[6]See the Office Action dated May 17, 2006, page 2, line 22 to page 3, line 4.
[7]See the Advisory Action of September 12, 2006, page 2, lines 8-9.

As neither McDowell nor Pages teaches or suggests "a navigation computer" or "a dedicated communication link" as recited in Claim 1, Claim 1 (and Claims 2-10 dependent therefrom) is patentable over McDowell in view of Pages.

Claims 12 and 21 recite similar elements to Claim 1. Accordingly, Claims 12 and 21 (and Claims 13-20 and 22-29 dependent therefrom) are patentable over McDowell in view of Pages for at least the reasons described above with respect to Claim 1.

C. Claims 8-10, 19, and 27-29 further define over McDowell in view of Pages

The non-entered amendment filed September 29, 2006 added the subject matter of Claim 9 to Claim 1. In response, the Advisory Action of October 13, 2006 asserted that:

> It is well known that any control of the moving of the aircraft surfaces will effect (or associated) with roll rate or vertical load factor of the aircraft. Since the autopilot system taught by McDowell involves commanded angle for the surface to move, since the commanded angle of the surface will associated (effect) the roll rate of the aircraft, the commanded angle for the surface to move taught by McDowell should obviously associated with the roll rate of the aircraft.[8]

Even assuming *arguendo* that a roll rate command is known in the art as a ***guidance command***, the invention recited in Claim 1 transmits this parameter from a navigation computer to a flight control computer over ***a dedicated communication link***. It is respectfully submitted that neither McDowell nor Pages teach or suggest such a dedicated communication link.

In fact, as noted above, link 52 of McDowell only sends actuator commands to actuators 42. A commanded roll rate is very different from the actuator command that is sent to the actuator. A guidance algorithm computes a guidance command such as a roll rate, and an autopilot algorithm is input with the guidance commands and computes actuator

[8]The Advisory Action dated October 13, 2006, page 2, lines 3-7.

commands. Thus, as autopilot 14 of McDowell sends actuator command signals to the secondary surfaces 42 over link 52 of McDowell, autopilot 14 of McDowell is burdened with computing ***both*** guidance commands and actuator commands.[9] Accordingly, the device of McDowell cannot reduce the time taken for the critical path calculations as much as the invention recited in Claim 1.

In addition, as link 52 of McDowell only sends actuator commands, link 52 cannot be "a dedicated communication link configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer," as link 52 does not transmit "a commanded roll rate."

With regard to the general statement in the Advisory Action stating "Since the autopilot system taught by McDowell involves commanded angle for the surface to move, since the commanded angle of the surface will associated (effect) the roll rate of the aircraft, the commanded angle for the surface to move taught by McDowell should obviously associated with the roll rate of the aircraft," such a conclusion ignores the language of the claims, contrary to well settled case law. Apparently the Advisory Action is conceding that neither McDowell nor Pages describes "a dedicated communication link configured to transmit the ***automatic pilot instructions*** from the navigation computer to the flight control computer," but since McDowell describes transmitting actuator commands, that renders the claimed invention obvious. However, *In re Royka* holds that to establish *prima facie* obviousness of a claimed invention, ***all the claim limitations must be taught or suggested by the prior art***. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). (Emphasis added). See also MPEP §2143.03. As "a dedicated communication link configured to transmit the ***automatic pilot instructions*** from the navigation computer to the flight control computer ... wherein said automatic pilot instructions and said control instructions correspond to a

[9]See McDowell, column 6, lines 39-48.

commanded roll rate" is not taught or suggested by either McDowell or Pages, a *prima facie* case of obviousness has not been made with respect to Claim 9. In a similar manner, the subject matter of Claims 8, 10, 19, and 27-29 is not taught or suggested by McDowell or Pages either. Consequently, Claims 8-10, 19, and 27-29 further define over McDowell in view of Pages.

Conclusion

It is respectfully requested that the outstanding rejections be REVERSED.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

Claim 1: A system for operating an aircraft, comprising:

a navigation computer comprising:

a first input configured to receive guidance instructions including heading, vertical speed, and altitude,

a second input configured to receive guidance parameters, and

an output configured to output automatic pilot instructions computed by said navigation computer from said guidance instructions;

a flight control computer comprising:

a first input configured to receive control instructions,

a second input configured to receive said automatic pilot instructions, and

a command generator configured to generate a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode; and

a dedicated communication link configured to transmit the automatic pilot instructions from the navigation computer to the flight control computer.

Claim 2: The system of Claim 1, wherein said command generator is configured to generate a second plurality of operating commands based on said control instructions in a manual pilot mode.

Claim 3: The system of Claim 1, wherein said flight control computer further comprises a third input configured to receive control parameters.

Claim 4: The system of Claim 1, wherein said command generator is configured to generate said first and second pluralities of operating commands based on a single control function.

Claim 5: The system of Claim 4, wherein said single control function is embedded in said flight control computer.

Claim 6: The system of Claim 1, wherein said navigation computer generates said automatic pilot instructions based on said guidance instructions and on said guidance parameters.

Claim 7: The system of Claim 6, wherein said automatic pilot instructions correspond in nature to said control instructions.

Claim 8: The system of Claim 7, wherein said automatic pilot instructions and said control instructions correspond to a commanded vertical load factor.

Claim 9: The system of Claim 7, wherein said automatic pilot instructions and said control instructions correspond to a commanded roll rate.

Claim 10: The system of Claim 7, wherein said automatic pilot instructions and said control instructions correspond to a commanded yaw.

Claim 11 (Canceled).

Claim 12: A system for operating an aircraft, comprising:

a navigation computer comprising:

means for receiving guidance instructions including heading, vertical speed, and altitude,

means for receiving guidance parameters, and

means for outputting automatic pilot instructions computed by said navigation computer from said guidance instructions;

a flight control computer comprising:

means for receiving control instructions,

means for receiving said automatic pilot instructions, and

means for generating a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode; and

dedicated communication means for transmitting the automatic pilot instructions from the navigation computer to the flight control computer.

Claim 13: The system of Claim 12, wherein said flight control computer further comprises means for generating a second plurality of operating commands based on said control instructions in a manual pilot mode.

Claim 14: The system of Claim 12, wherein said flight control computer further comprises means for receiving control parameters.

Claim 15: The system of Claim 12, wherein said first and second pluralities of operating commands are based on a single control function.

Claim 16: The system of Claim 15, wherein said single control function is embedded in said flight control computer.

Claim 17: The system of Claim 12, wherein said navigation computer further comprises means for generating said automatic pilot instructions based on said guidance instructions and on said guidance parameters.

Claim 18: The system of Claim 17, wherein said automatic pilot instructions correspond in nature to said control instructions.

Claim 19: The system of Claim 17, wherein said automatic pilot instructions correspond to a commanded vertical load factor, commanded roll rate, and a commanded yaw.

Claim 20: The system of Claim 19, wherein said control instructions correspond to a commanded vertical load factor, commanded roll rate, and a commanded yaw.

Claim 21: A system for operating an aircraft, comprising:

a navigation computer configured to receive guidance instructions and parameters, and to output automatic pilot instructions;

a flight control computer configured to receive control instructions and said automatic pilot instructions, and to generate a first plurality of operating commands based on said automatic pilot instructions in an automatic pilot mode; and

a dedicated communication link configured to transmit the automatic pilot

instructions from the navigation computer to the flight control computer.

Claim 22: The system of Claim 21, wherein said flight control computer is configured to generate a second plurality of operating commands based on said control instructions in a manual pilot mode.

Claim 23: The system of Claim 21, wherein said flight control computer further comprises a third input configured to receive control parameters.

Claim 24: The system of Claim 21, wherein said flight control computer is configured to generate said first and second pluralities of operating commands based on said single control function.

Claim 25: The system of Claim 21, wherein said navigation computer generates said automatic pilot instructions based on said guidance instructions and on said guidance parameters.

Claim 26: The system of Claim 25, wherein said automatic pilot instructions correspond in nature to said control instructions.

Claim 27: The system of Claim 26, wherein said automatic pilot instructions and said control instructions correspond to a commanded vertical load factor.

Claim 28: The system of Claim 26, wherein said automatic pilot instructions and said control instructions correspond to a commanded roll rate.

Claim 29: The system of Claim 26, wherein said automatic pilot instructions and said control instructions correspond to a commanded yaw.

Claim 30 (Canceled).

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.